# Andromeda Cartographers

Present:

Universal Lens

## Executive Overview

**Problem**: Nasa researchers cannot access details on the images without the need for a powerful machine that can read the data in the image.

**Solution**: Our solution is to create an application that can take large images and break them down into smaller readable images which are then put together in a 3D model like mold, inspired by google maps, that allows them to zoom in and out of the image as well as scroll through it. This allows them

to concentrate on the desired coordinates of the image so that they can analyse and find patterns. These coordinates can be saved and saved with comments and stored as bookmarks for the researchers for future reference.

**Future implementation:** Using uploaded images that will include the Right Ascension and Declination coordinates to geo reference the position in space and use that data to train an AI model to recognize “objects” in space and place them in the “map”.  AI implementation will also train model to recognize pattern in the same celestial space using different images.

This solution is aimed at Nasa’s study of large scale telescope images as of now as it helps navigate said image as well as study celestial objects at different resolution levels. However, it is not limited to the field. Such an application can be used for any field such as the medical field by exploring microscope images or high resolution medical scans,  or even the art and cultures field by allowing comparison at different zoom levels of artworks or study patterns of artifacts from ancient civilization (archeology).

This is to say that we will mostly concentrate on telescope images the solution proposed is ideal for a myriad of fields in different uses.

## Key Advantages:

* Zoom in/out without losing resolution
* Save coordinates with notes
* Login
* Get the size of different space bodies (function with parameters of info we don’t know for scale calculations)
* Free to use for both researchers and interested people such as students
* The solution is expandable to multiple fields and has the opportunity to grow

## Resources:

* OpenSeaDragon (like Leaflet, but better)
* Nasa Images ()
  + FITS format
* AI
  + Deepseek
  + Perplexity
* Node JS
* jsFITS I/O library
* GitHub
* Leaflet
* MongoDb
* James web telescope
* How to handle datasets-> open data and information portal government of Canada: <https://search.open.canada.ca/data/>
* Tutorials on GitHub
* Micro application -> easier visualization of data
* Canadian Astronomy Data Centre archive -> collections (has telescope data)
* Canadian Astronomy Center
* EODMS
* Registry of open data of AWS
* CSA open data

## Challenges:

What is the best way to zoom into an image without losing quality and keep the same high resolution?

How can one locate themselves in the image, how to use coordinates on space? -> Using geo-referencing points. -> FITS images provide celestial coordinates

Notes from astrophysics coach:

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*Right ascension and declination are assigned to every point/coordinate*

*To map objects on coordinates systems.*

*Celestial sphere -> so we need trigonometric functions*

*Paralex/parallax method to measure objects nearby*

*With just the angles, you can reference objects in the sky and map*

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